

Name: _____

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Lakeside Academy MYP 3 - Worksheet # 204.1

Analytical Geometry: Division Point of a Line Segment

| | |
|--|---|
| $Change\ in\ x : \Delta x = x_2 - x_1$ $Change\ in\ y : \Delta y = y_2 - y_1$ | |
| $Division\ Point : (x_D = x_1 + (\frac{a}{a+b})(\Delta x), y_D = y_1 + (\frac{a}{a+b})(\Delta y))$ | |
| <i>Remember Ratio vs. Fraction</i> | |
| <u>Ratio</u> $a : b$ $a\ to\ b$ ratio $\frac{a}{b}$ | <u>Fraction</u> $\frac{a}{a+b}$ $a\ out\ of\ a + b$ |

1) Determine the coordinate of *Point D* that divides line segment \overline{AB} in a ratio 1:3 from *Point A* (-4, 8) to *Point B*(12, -32)

$$x_D = x_1 + \left(\frac{a}{a+b}\right)(\Delta x)$$

$$y_D = y_1 + \left(\frac{a}{a+b}\right)(\Delta y)$$

Workshop

$A(-4, 8)$ $B(12, -32)$

$a =$ $\Delta x = x_2 - x_1$

$b =$

$a + b =$

$x_1 =$ $\Delta y = y_2 - y_1$

$y_1 =$

Point D(,)

2) Determine the coordinate of *Point D* that divides line segment \overline{EF} in a ratio 1:3 from *Point E* (- 16, 12) to *Point F*(32, - 48)

$$x_D = x_1 + \left(\frac{a}{a+b}\right)(\Delta x)$$

$$y_D = y_1 + \left(\frac{a}{a+b}\right)(\Delta y)$$

Workshop

E (- 16, 12) *F*(32, - 48)

a = $\Delta x = x_2 - x_1$

b =

a + *b* =

*x*₁ = $\Delta y = y_2 - y_1$

*y*₁ =

Point D(,)

3) Determine the coordinate of *Point D* that divides line segment \overline{GH} two thirds of the way from *Point G*(- 7, 15) to *Point H*(2, - 6)

$$x_D = x_1 + \left(\frac{a}{a+b}\right)(\Delta x)$$

$$y_D = y_1 + \left(\frac{a}{a+b}\right)(\Delta y)$$

Workshop

G (- 7, 15) *H*(2, - 6)

a = $\Delta x = x_2 - x_1$

b =

a + *b* =

*x*₁ = $\Delta y = y_2 - y_1$

*y*₁ =

Point D(,)

4) Determine the coordinate of *Point D* that divides line segment \overline{IJ} in a ratio 2:3 from *Point J* (- 7, 16) to *Point I*(3, - 4)

$$x_D = x_1 + \left(\frac{a}{a+b}\right)(\Delta x)$$

$$y_D = y_1 + \left(\frac{a}{a+b}\right)(\Delta y)$$

Workshop

$I(2, -4)$ $J(-7, 16)$

$a =$ $\Delta x = x_2 - x_1$

$b =$

$a + b =$

$x_1 =$

$\Delta y = y_2 - y_1$

$y_1 =$

Point D(,)

5) Determine the coordinate of *Point D* that divides line segment \overline{KL} $\frac{2}{7}$ from *Point K*(14, 49) to *Point L*(35, 77)

$$x_D = x_1 + \left(\frac{a}{a+b}\right)(\Delta x)$$

$$y_D = y_1 + \left(\frac{a}{a+b}\right)(\Delta y)$$

Workshop

$K(14, 49)$ $J(35, 77)$

$a =$ $\Delta x = x_2 - x_1$

$b =$

$a + b =$

$x_1 =$

$\Delta y = y_2 - y_1$

$y_1 =$

Point D(,)

6) Determine the coordinate of *Point D* that divides line segment \overline{PQ} a quarter of the way from *Point Q* (- 1, 3) to *Point P*(53,- 17)

$$x_D = x_1 + \left(\frac{a}{a+b}\right)(\Delta x)$$

$$y_D = y_1 + \left(\frac{a}{a+b}\right)(\Delta y)$$

Workshop

$Q(-1, 3)$ $P(53, -17)$

$$a = \qquad \Delta x = x_2 - x_1$$

$$b =$$

$$a + b =$$

$$x_1 = \qquad \Delta y = y_2 - y_1$$

$$y_1 =$$

Point D(,)

7) Determine the coordinate of *Point D* that divides line segment \overline{RS} in a ratio 3 : 5 from *Point R* (- 77, - 24) to *Point S*(11, 48)

$$x_D = x_1 + \left(\frac{a}{a+b}\right)(\Delta x)$$

$$y_D = y_1 + \left(\frac{a}{a+b}\right)(\Delta y)$$

Workshop

$R(-77, -24)$ $S(11, 48)$

$$a = \qquad \Delta x = x_2 - x_1$$

$$b =$$

$$a + b =$$

$$x_1 = \qquad \Delta y = y_2 - y_1$$

$$y_1 =$$

Point D(,)